

WHAT IS CLAIMED IS:

1. A percussion pad comprising

a surface to be beaten by a player,

an accumulator made of resilient material, connected in series to said surface so as to be locally deformed at each beat by said player for accumulating an elastic strain energy and locally vibratory while said elastic strain energy is being released, and

a base made of a material smaller in resiliency than said accumulator, provided on the opposite side of said accumulator from said surface and held in contact with said accumulator for permitting said accumulator to be locally deformed.

2. The percussion pad as set forth in claim 1, further comprising a solid portion made of a resilient material having a large damping factor and having an obverse surface serving as said surface and a reverse surface connected to said accumulator.

3. The percussion pad as set forth in claim 2, in which said accumulator is formed by an array of pillars projecting from said reverse surface of said solid portion toward said base.

4. The percussion pad as set forth in claim 3, in which said solid portion and said array of pillars are formed in a monolithic pad body.

5. The percussion pad as set forth in claim 4, in which said monolithic pad body is made of elastomer.

6. The percussion pad as set forth in claim 3, in which said pillars are shaped into a frustum, and are integral with said solid portion.
7. The percussion pad as set forth in claim 3, in which said array has large-sized pillars and small-sized pillars.
8. The percussion pad as set forth in claim 3, in which said array contains the pillars arranged at a high density and other pillars arranged at a low density.
9. The percussion pad as set forth in claim 3, further comprising a cushion layer made of said resilient material and having an obverse surface bonded to said accumulator and a reverse surface bonded to said base.
10. The percussion pad as set forth in claim 1, in which said accumulator is formed by an array of pillars projecting from a solid portion made of a resilient material, and surfaces at the tips of said pillars form in combination said surface to be beaten by said player.
11. The percussion pad as set forth in claim 10, said solid portion and said array of said pillars are formed in a monolithic pad body.
12. The percussion pad as set forth in claim 11, in which said monolithic pad body is made of elastomer.
13. The percussion pad as set forth in claim 10, further comprising a cover sheet made of a durable resilient material and having an obverse surface serving as said surface and a reverse surface bonded to said surfaces at said tips of said pillars.

14. The percussion pad as set forth in claim 1, further comprising a supporter for keeping said base held in contact with said accumulator.
15. The percussion pad as set forth in claim 14, in which said supporter is formed by a protection sheet covering a reverse surface of said base reverse to an obverse surface held in contact with said accumulator and secured to said accumulator.
16. The percussion pad as set forth in claim 14, in which said protection sheet is formed with an air-vent allowing the air to pass therethrough when said accumulator is deformed.
17. The percussion pad as set forth in claim 1, further comprising a head body made of a resilient material and having an obverse surface serving as said surface and an array of pillars for accumulating an elastic strain energy at each beat and connected in series to said accumulator.
18. The percussion pad as set forth in claim 17, in which said accumulator is formed by another array of pillars projecting from a solid portion to said base, and said array of pillars is held in contact with said solid portion.
19. The percussion pad as set forth in claim 18, further comprising another base smaller in resiliency than said array of pillars and provided between said array of pillars and said solid portion.
20. A silent percussion instrument comprising:
 - a percussion pad including a surface to be beaten by a player, an accumulator made of resilient material, connected in series to said surface so as to be locally deformed at each beat by said player for accumulating an elastic strain

energy and locally vibratory while said elastic strain energy is being released, and a base made of a material smaller in resiliency than said accumulator, provided on the opposite side of said accumulator from said surface and held in contact with said accumulator for permitting said accumulator to be locally deformed;

a supporting structure for keeping said percussion pad in an attitude convenient to be beaten by said player; and

a coupling device connected between said percussion pad and said supporting structure for preventing said percussion pad from separation from said supporting structure.

21. The silent percussion instrument as set forth in claim 20, in which said percussion pad further includes a solid portion made of a resilient material and connected in series to said accumulator, a rigid portion coupled to said supporting structure by means of said coupling device and a resilient portion provided between said solid portion and said rigid portion for permitting said percussion pad to repeatedly move in a direction in which said drummer exerts a force on said surface.

22. The silent percussion instrument as set forth in claim 20, further comprising a supporter for keeping said base held in contact with said accumulator.

23. The silent percussion instrument as set forth in claim 22, in which said supporter has

plural brackets secured to said supporting structure at intervals and

plural cushion blocks respectively secured to said plural brackets and held in contact with said base for preventing said base from separation from said accumulator.

24. The silent percussion instrument as set forth in claim 22, in which said supporter has a protection layer covering a reverse surface of said base and secured to a peripheral portion of said solid portion.

25. The silent percussion instrument as set forth in claim 20, in which said percussion pad and said supporting structure have a shape analogous to that of a drum head forming a part of an acoustic drum and another shape analogous to that of a shell forming another part of said acoustic drum.

26. The silent percussion instrument as set forth in claim 20, further comprising at least one vibration sensor monitoring said percussion pad to see whether or not said player gives said surface an impact and producing an electric signal representative of said impact when said at least one vibration sensor finds said player to give said impact.

27. The silent percussion instrument as set forth in claim 26, further comprising another vibration sensor monitoring said supporting structure to see whether or not said player gives an impact to said supporting structure and producing an electric signal representative of said impact when said another vibration sensor finds said player to give said impact.

28. A silent percussion instrument set comprising plural silent percussion instruments, at least one of said plural silent percussion instruments including

a percussion pad having a surface to be beaten by a player, an accumulator made of resilient material, connected in series to said surface so as to be locally deformed at each beat by said player for accumulating an elastic strain energy and locally vibratory while said elastic strain energy is being released and a base made of a material smaller in resiliency than said accumulator, provided on the opposite side of said accumulator from said surface and held in contact with said accumulator for permitting said accumulator to be locally deformed,

a supporting structure for keeping said percussion pad in an attitude convenient to be beaten by said player, and

a coupling device connected between said percussion pad and said supporting structure for preventing said percussion pad from separation from said supporting structure.

29. The silent percussion instrument set as set forth in claim 28, in which said one of said plural silent percussion instruments further comprises at least one vibration sensor monitoring said percussion pad to see whether or not said player gives said surface an impact and producing an electric signal representative of said impact when said at least one vibration sensor finds said player to give said impact.

30. The silent percussion instrument set as set forth in claim 29, in which said one of said plural silent percussion instruments further comprises another vibration sensor monitoring said supporting structure to see whether or not said player gives an impact to said supporting structure and producing an

electric signal representative of said impact when said another vibration sensor finds said player to give said impact.

31. The silent percussion instrument set as set forth in claim 28, in which the others of said plural silent percussion instruments have respective percussion pads, respective supporting structures and respective coupling devices respectively similar to said percussion pad, said supporting structure and said coupling device.

32. The silent percussion instrument as set forth in claim 31, in which each of said others of said plural silent percussion instruments includes at least one vibration sensor monitoring said percussion pad to see whether or not said player gives said surface an impact and producing an electric signal representative of said impact when said at least one vibration sensor finds said player to give said impact.

33. The silent percussion instrument set as set forth in claim 32, in which each of said others of said plural silent percussion instruments further includes another vibration sensor monitoring said supporting structure to see whether or not said player gives an impact to said supporting structure and producing an electric signal representative of said impact when said another vibration sensor finds said player to give said impact.

34. The silent percussion instrument set as set forth in claim 32, further comprising a percussion sound generating system connected to said at least one vibration sensor of said one of said plural silent percussion instruments and said at least one vibration sensor of said each of said others of said plural si-

lent percussion instruments and selectively producing different sorts of percussion sound in response to said electric signals.

35. The silent percussion instrument set as set forth in claim 28, in which said one of said plural silent percussion instruments has an external appearance close to an acoustic drum.

36. The silent percussion instrument set as set forth in claim 28, in which said one of said plural silent percussion instruments has an external appearance close to an acoustic cymbal.

37. An electronic percussion system, comprising:

a silent percussion instrument including a percussion pad including a surface to be beaten by a player, an accumulator made of resilient material, connected in series to said surface so as to be locally deformed at each beat by said player for accumulating an elastic strain energy and locally vibratory while said elastic strain energy is being released and a base made of a material smaller in resiliency than said accumulator, provided on the opposite side of said accumulator from said surface and held in contact with said accumulator for permitting said accumulator to be locally deformed, a supporting structure for keeping said percussion pad in an attitude convenient to be beaten by said player and a coupling device connected between said percussion pad and said supporting structure for preventing said percussion pad from separation from said supporting structure;

at least one vibration sensor monitoring said percussion pad to see whether or not said player beats said surface and producing an electric signal when said player gives each beat to said surface; and

an electronic percussion sound generator connected to said at least one vibratory sensor, carrying out a data processing on pieces of data information on said electric signal for producing an audio signal and converting said audio signal to an electronic percussion sound.

38. The electronic percussion system as set forth in claim 37, in which said at least one vibration sensor monitors said percussion pad to see whether or not said player gives an impact thereto, and produces said electric signal representative of said impact.

39. The electronic percussion system as set forth in claim 38, further comprising another vibration sensor monitoring said supporting structure to see whether or not said player gives an impact thereto and producing another electric signal representative of said impact, and in which said another electric signal is supplied to said electronic percussion sound generator so as to be processed as similar to said electric signal.

40. The electronic percussion system as set forth in claim 38, in which said at least one vibration sensor monitors said percussion pad and said supporting structure to see whether or not said player gives an impact thereto, and produces said electric signal representative of said impact, and in which said electronic percussion sound generator selectively produces different sorts of

electronic percussion sound depending upon the decision on said electric signal.